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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,994	10/31/2003	Naoshige Itami	3408.68664	8859

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GREER, BURNS & CRAIN
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CHICAGO, IL 60606

EXAMINER

VU, PHU

ART UNIT PAPER NUMBER

2871

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/698,994

Applicant(s)

ITAMI ET AL.

Examiner

Phu Vu

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 17 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 10-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 7/6/2006 have been fully considered but they are not persuasive. Applicant has argued Kim does not teach random wrinkles of micro grooves achieved by "selectively reforming the surface portion by applying said energy" to generate a difference in thermal shrinkage" and "performing heat treatment to said resin layer" and asserts Kim discloses forming a patterned wrinkles of micro-grooves. However, Kim's partial UV curing appears to meet the exact claimed limitation. Kim teaches partially curing a photosensitive resin layer through a mask. The mask introduces "selective reformation" of the resin layer. Additionally, partially developing parts of the resin layer causes a difference in thermal expansion once the substrate is heated as the masked portions of the photoresin are left undeveloped and thus expand differently when heated. Furthermore applicant's specification also reveals a mask (see figure 14A) used to selectively treat a resin layer. Therefore, it appears the broadest possible interpretation of the claim is met by the cited references since the limitations of "selectively reforming ... by applying energy" can be interpreted as irradiation through a mask. If additional steps or limitations are required to create "random wrinkles of micro-grooves" than this is not apparent.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3 and 9 are rejected under 35 U.S.C. 103(a) as being obvious over Kim et al US Patent No 6380995.

Regarding claim 1, Kim teaches a method of manufacturing a substrate for a liquid crystal display device comprising the steps of forming a resin layer on a substrate; selectively reforming the surface portion of the resin layer by applying energy with an energy per unit time of a prescribed value or more to said resin layer to generate a thermal shrinkage (which is achieved by partially curing) between said surface portion and the layer portion other than the surface portion in the resin layer; performing a heat treatment to said layer to form wrinkles of micro-grooves in said surface portion, and forming reflective electrodes on the surface portion (see column 3 lines 45-57 and column 4 lines 1-10). The reference does not explicitly state the energy-applied results in a difference in thermal shrinkage however this is a property as a direct result of partially curing. Therefore, it would have been obvious to generate a difference in thermal shrinkage, as it is a direct result of partial curing of a resin layer since the cured portions will expand differently than uncured portions. While the reference shows random wrinkles of micro-grooves formed as shown in fig. 2 each of the wrinkles of micro-grooves of surface 33 are of different size and considered random.

Regarding claims 2 and 3, the reference teaches energy is applied by irradiation with ultraviolet light (see column 3 lines 45-57).

Regarding claim 9 with respect to claims 1 - 2, the reference teaches a liquid crystal display in which a pair of substrates are manufactured and the substrates are

mutually stuck together so that liquid crystal is sealed between the substrates (see figure 2).

Claims 4 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ichimura et al US Patent No 6327009.

Regarding claim 4, Kim teaches all the limitations of claim 4 except the energy applied exceeding 12 mW/cm^2 . Ichimura discloses a process of curing a photosensitive resin by heating and partially curing the uses UV light exceeding 12 mW/cm^2 to create a display with improved visibility (see column 2 lines 58-65 and column 5 lines 25-60). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a UV curing process exceeding 12 mW/cm^2 to create a display with improved visibility.

Regarding claim 7 with respect to claims 1-4, Kim teaches use of a photosensitive resin (see column 3 lines 45-57).

Regarding claim 8 with respect to claims 1-4, Kim discloses all the limitations of claim 8 except the photosensitive resin is a novolac resist. Ichimura discloses novolac as a commercially available resin (see column 8 lines 4-14). Therefore, it would have been obvious to one of ordinary skill in the art to use novolac as it is readily available photosensitive resin.

Regarding claim 9 with respect to claims 3-4, Kim teaches a liquid crystal display in which a pair of substrates are manufactured and the substrates are mutually stuck together so that liquid crystal is sealed between the substrates (see figure 2).

Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Codama US Patent no 6339291.

Regarding claims 5-6 and claim 8 with respect to claims 5 and 6, Kim discloses all the limitations of claims 5 and 6 except irradiation of ultraviolet rays with an illumination below 12 mW/cm^2 of a novolac resin layer in a semi-hardened condition prior to application of energy and wherein the heat treatment of the resin layer is performed at a prescribed temperature prior to application of energy. Codama teaches a semi-hardened novolac resin wherein energy is applied at a rate of 10 mW/cm^2 wherein the resin layer is semi-hardened prior to the application energy through heat treatment a prescribed temperature that undergoes little shrinkage during curing (see column 8 lines 6-11 and 60-67 and 9 lines 1-6). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a novolac resin wherein energy is applied at a rate of 10 mW/cm^2 to a semi-hardened resin layer to reduce shrinkage during curing. While Codama's invention pertains to a organic EL device Codama also states that these features are applicable to liquid crystal technology (see column 12 line 10-11).

Regarding claim 7 with respect to claims 5-6, Kim teaches use of a photosensitive resin (see column 3 lines 45-57).

Regarding claim 9 with respect to claims 5-6, Kim teaches a liquid crystal display in, which a pair of substrates are manufactured and the substrates are mutually stuck together so that liquid crystal is sealed between the substrates (see figure 2).

Claims 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichimura US 6181397 in view of Yoshii 20020030774.

Regarding claim 14, Ichimura teaches a method of manufacturing a substrate for a liquid crystal display device comprising the steps of: forming a resin layer on a substrate (fig. 3 element 12), selectively reforming the surface portion of the resin layer by applying energy and energy density per unit time of a prescribed value or more to said resin layer without using a mask to generate a difference in a rate of thermal shrinkage between said surface portion and the other layer portion other than the surface portion in said resin layer (see fig. 3C), and performing heat treatment (column 9 line 51) on the resin layer to form wrinkles of micro-grooves in said surface portion; and forming reflective electrodes on said surface portion (13a). The reference fails to teach the wrinkles of micro-grooves being random however, Yoshi teaches a reflective layer formed by using a similar process that forms random wrinkles of micro-grooves (see fig. 8 and fig. 10) that provides high reflectance over a wide angle ([0015]) therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to form random wrinkles of micro-grooves to gain high reflectance over wide angles.

Regarding claims 15-17, the reference teaches the application of energy is performed by ultraviolet light exceeding 12 mw/cm² (column 9 lines 40-45).

Claim 18 is rejected under 35 U.S.C. 103(a) as being obvious over Ichimura in view of Yoshii and further view of Codama US Patent no 6339291.

Regarding claim 18 except irradiation of ultraviolet rays with an illumination below 12 mW/cm^2 of the photoresist in a semi-hardened condition prior to application of energy and wherein the heat treatment of the resin layer is performed at a prescribed temperature prior to application of energy. Codama teaches a semi-hardened novolac resin wherein energy is applied at a rate of 10 mW/cm^2 wherein the resin layer is semi-hardened prior to the application energy through heat treatment a prescribed temperature that undergoes little shrinkage during curing (see column 8 lines 6-11 and 60-67 and 9 lines 1-6). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a novolac resin wherein energy is applied at a rate of 10 mW/cm^2 to a semi-hardened resin layer to reduce shrinkage during curing. While Codama's invention pertains to a organic EL device Codama also states that these features are applicable to liquid crystal technology (see column 12 line 10-11).

Conclusion

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

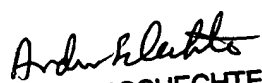
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562.

The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu
Examiner
AU 2871


ANDREW SCHECHTER
PRIMARY EXAMINER